

4.7 Pre-Flight Integrated Verification & Test Assurance Processes

4.7.1 Integrated System Test Process

Upon completion of assembly and integration, the X-37 will be subjected to a series of systems tests to verify implementation of system requirements. The systems test responsibility comes under the Systems Test IPT. The overall system test program identifies a three-phase test flow approach.

Phase 1

Phase 1 consists of three levels of pallet testing. The first is Pallet Level Functional Testing. The second level consists of Pallet Integrated Testing – standalone. The third level is the Pallet Functional Testing (soft-mate) with the X-37. This series of tests are to be performed at Huntington Beach. At successful conclusion of this phase, the X-37 is ready to support the B-52 Integrated System Test described in the next phase.

Phase 2

Pre-approach and landing tests (ALT) integrated testing will be performed making maximum use of flight vehicle functionality for those systems active during the ALT program:

- Entry GN&C verification (Software)
- Avionics Functionality (Guidance, Command and Control (RF Systems), Air Data Sensors and Power
- Mechanical Systems Functionality (Landing Gear and Brakes, Surrogate Aero Surfaces)
- Vehicle Characterization for GN&C (Guidance-Alignment Verification, Mass Properties-Weight and C.G., Aero Surfaces-Ground Vibration Testing

Upon successful completion of this phase of system testing, the X-37 is ready to support the B-52 flight operations testing at DFRC as described in section 4.8.

Upon completion of the ALT flight testing, the X-37/AR2-3 will undergo a Flight Readiness Firing (FRF) at a facility located near DFRC.

Following the X-37 FRF the vehicle will be shipped to Huntington Beach for the next phase of the test program.

Phase 3

Pre-orbital flight test functional and environmental testing is designed to encompass the full rigor of space flight environments and operational requirements. Environmental test series are based on flow down of requirements from the Space

Shuttle/Payload ICD-2 19001. A tailored proto-qualification/flight proof strategy based upon MIL-STD-1540C will include the following:

- Propulsion leak and proof load test
- SV Alignment verification
- Functional test
- Weight and center of gravity
- Ground vibration test and modal survey
- X-37 free body with minimum H₂O₂
- X-37 free body with maximum H₂O₂
- Thermal vacuum and balance test
- X-37 free body proto-qualification
- X-37 free body thermal balance
- EMI/EMC (per MIL-STD-1540C 6.2.2, qualification level tailored to MIL STD-1541)
- Acoustic test (levels per MIL-STD-1540C, acceptance level plus 3db)
- X-37 free body
- X-37 with launch ring
- Final alignment
- Final Factory Test

Upon the successful completion of these final series of system tests, the X-37 will be shipped to KSC in preparation for launch in the Space Shuttle and orbital flight operations.